

REMARKS

Examiner Interview

The undersigned attorney for applicants thanks Examiner Merklings for the telephone interview held on 16-Feb-2010 during which the final rejection and the cited references were discussed. As stated in the Interview Summary, the examiner indicated that more structure of the “fluidized bed” was required to remove the current grounds of rejection. Also, the Examiner indicated that he would entertain arguments as to why the Monacelli and Frewer references could not be combined in the manner he suggested in the final office action.

Related Applications, Appeals & Proceedings

There are no other related applications, appeals or proceedings.

Status of Amendments

Independent claims 33, 94 and 104 are being amended at this time.

Independent claims 33, 94 and 106 have been amended to recite that the first fluidized bed is “located in a first apparatus” and that the solids collection reservoir is “separate from the first apparatus in which the fluidized bed is located.” Support for this language can be found in the original specification at page 24, lines 24-25, which says that the “carbon trim cell 40 is shown separate from the thermochemical apparatus 10” (which comprises the fluidized bed 14).

Status of the Claims

Claims 1-32, 39-40, 44, 46-93, 104 and 111-114 have been canceled.

Claims 33-38, 41-43, 45, 94-103, 105-110, 115-117 stand rejected under 35 USC 103(a).

Claims 33-38, 41-43, 45, 94-103, 105-110, 115-117 and claims 118-120, as amended, are being submitted for the Examiner’s consideration.

Grounds of Rejection

Claims 33-37, 41-43, 45, 94-99, 101-103 and 105-109 stand rejected under 35 USC 103(a) as being unpatentable over Monacelli (USP 5,752,994) in view of Mansour (USP 5,306,481) and Atwell (USP 2,680,065). (See paragraph 2 of the final office action).

Claims 33 and 94 stand rejected under 35 USC 103(a) as being unpatentable over Ashworth (USP 4,097,361) in view of Mansour. (See paragraph 3 of the final office action).

Claims 38, 100 and 110 stand rejected under 35 USC 103(a) as being unpatentable over Monacelli, Mansour and Atwell as applied to claims 19, 33, 94 and 106, and further in view of Tanca (USP 5,624,470). (See paragraph 4 of the final office action).

Claims 115-117 stand rejected under 35 USC 103(a) as being unpatentable over Monacelli, Mansour and Atwell as applied to claims 33, 94 and 106, and further in view of Ashworth. (See paragraph 5 of the final office action).

Claims 118-120 stand rejected under 35 USC 103(a) as being unpatentable over Monacelli, Mansour and Atwell as applied to claims 33, 94 and 106, and further in view of Frewer. (See paragraph 6 of the final office action).

Argument

1. Independent Claims 33, 94 and 106 are patentable because no combination of references renders obvious (a) a fluidized bed located in a first apparatus *in combination with* (b) a solids collection reservoir located below the bottom portion (of the fluidized bed) and separate from the first apparatus in which the fluidized bed is located

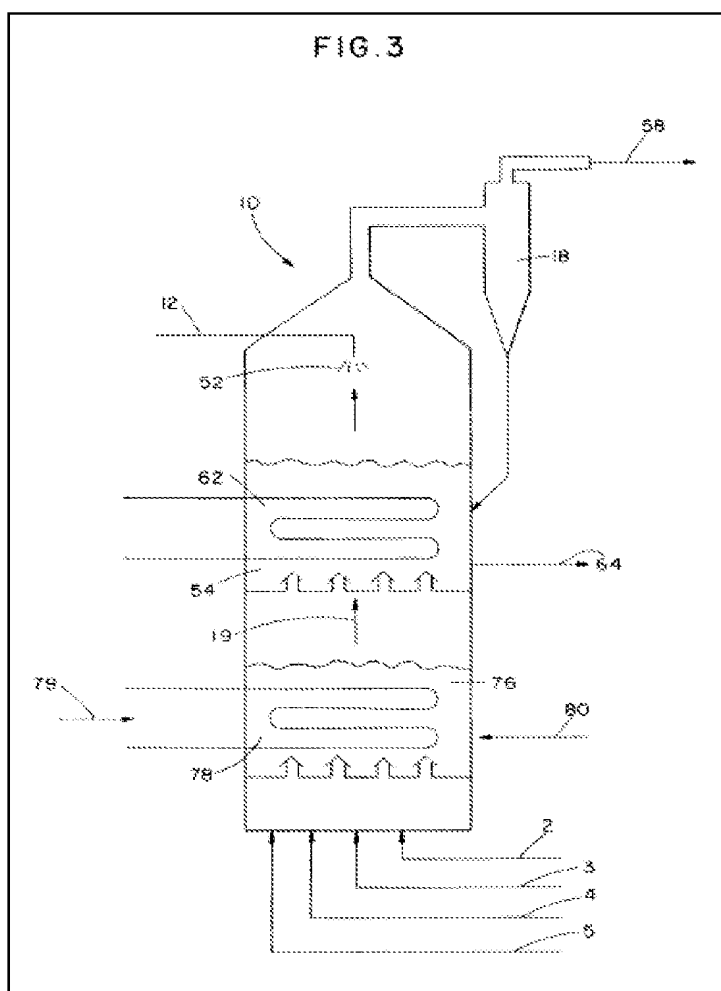
Each of the amended independent claims 33, 84, and 106 recite, inter alia, the following claim element:

feeding a carbonaceous material to a fluidized bed located in a first apparatus, the fluidized bed containing particles suspended in a fluid medium, the fluidized bed including a top portion and a bottom portion, the bottom portion being in communication with a solids collection reservoir located below the bottom portion and separate from the first apparatus in which the fluidized bed is located; (emphasis added)

It is submitted that no combination of the cited references renders obvious this claim element.

A. Monacelli does not show a solids collection reservoir separate from the apparatus in which the fluidized bed is located.

On page 2 of final office action, the Examiner refers to Monacelli's Fig. 3 which, as the Examiner puts it "illustrates that the solids collection reservoir (76) is indeed separate from the fluidized bed (54), they do not occupy the same volume." Monacelli's Fig. 3 is reproduced below.



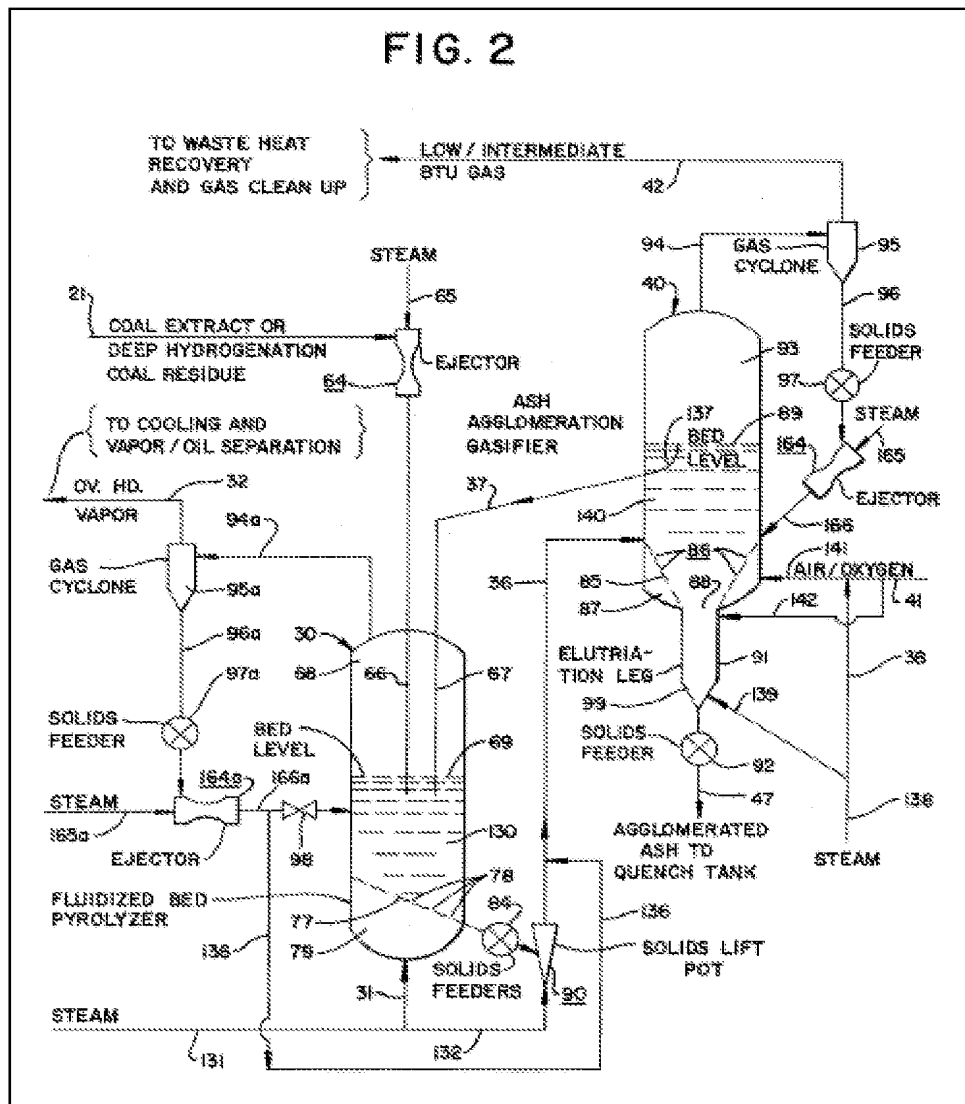
It is first submitted that the Examiner's characterization that "solids collection reservoir" is separate from the "fluidized bed" on grounds that "they do not occupy the same volume" is an unreasonable interpretation of what is shown in Monacelli's Fig. 3.

Even so, pending claims 33, 94 and 106 now read that (a) the fluidized bed is located in a first apparatus; and (b) the solids collection reservoir is located below the bottom portion (of the

fluidized bed) and separate from the first apparatus in which the fluidized bed is located. It is submitted that Monacelli clearly does not disclose such an arrangement.

B. Ashworth does not disclose a solids collection reservoir located below the bottom portion of the fluidized bed

On pages 6-7 of the final office action, the Examiner presents his analysis as to why claims 33 and 94 are unpatentable over Ashworth in view of Mansour. The Examiner relies in part on Ashworth's Fig. 2, which is reproduced below.



In formulating the rejection, the Examiner identifies “a first fluidized bed (30)” and states that Ashworth discloses “feeding the extracted solids to a . . . solids collection reservoir (40, col. 12, lines 26-33) separate from the first fluidized bed (see Fig. 2).’

It is noted that even if one were to consider Ashworth’s “char gasification unit 40” to be the claimed “solids collection reservoir” of pending claims 33 and 94, it is noted that the “char gasification unit 40” is not ‘located below the bottom portion of the first fluidized bed)”, as required by pending claims 33 and 94. To the contrary, Ashworth explicitly states that the “first fluidized bed (30)” is below the char gasification unit 40:

Because the pyrolysis unit 30 is at a lower elevation, it is necessary to pump the char and ash particles upwardly from the unit 30 to the unit 40. This is accomplished by use of steam pressure to force the particles upwardly through the conduit 36 to the bed 140. Pumping can be effected using equipment similar to a steam jet ejector, but it is preferable to employ a special solids lift pot 90.¹

Accordingly, the combination of Ashworth and Mansour does not render obvious claims 33 and 94.

In view of all the foregoing, it is submitted that claims 33, 94 and 116, and all claims depending thereon, define over the combinations of prior art relied on by the Examiner.

2. Independent Claims 33, 94 are patentable over Ashworth in view of Monacelli because Ashworth explicitly teaches away from additional heating

One page 7 of the office action, the Examiner first notes that Ashworth teaches utilizing heat from the partial combustion of char in the second fluidized bed (40) as the sole source of heat required for the first fluidized bed, and thus concedes that Ashworth does not disclose using a pulse combustor. However, the Examiner goes on to point out that Mansour does disclose pulse combustors and concludes that it would have been obvious to add Mansour’s pulse combustors, citing the alleged motivation “as a means to supplement to sole heat source for the endothermic reaction which takes place in the first fluidized bed with a highly efficient means to add heat.”

¹ Ashworth USP 5,752,994 at col. 12, lines 19-26. “[t]he ash-agglomerating char gasification unit 40 . . . has a fluidized bed of char and ash maintained at a high temperature below the ash fusion temperature, such as 1800°F to 2400° F. (about 980° C to 1320° C.) and preferably 1900°F to 2000° F. (about 1040°C to 1090° C). Id. At col. 6, lines 60-64.

It is submitted that the Examiner's alleged motivation simply does not exist because Ashworth explicitly states that additional heating is not needed because sufficient heat is provided by the char and ash received the char gasification unit 40:

The pyrolysis unit 30 employs a fluidized bed of hot ash and char. Preheated steam from conduit 31 is injected upwardly into the fluid bed as the fluidizing medium, whereby hydrogen required for the hydrogenation and hydrocracking reactions is produced by way of the steam-carbon and water-gas-shift reactions. No air or oxygen is required, and direct heating is not necessary because the heat requirements are supplied by hot recycled ash from the char gasification unit 40.²

In fact, in Ashworth, the temperature of the fluidized bed in the char gasification unit 40 is about 1000°F hotter than in the pyrolysis unit 30:

The pyrolysis unit 30 operates at a temperature from about 900°F to about 1200°F. (about 480°C to 650°C.) and preferably at least 925°F. (about 500°C).³

[T]he ash-agglomerating char gasification unit 40 . . . has a fluidized bed of char and ash maintained at a high temperature below the ash fusion temperature, such as 1800°F to 2400° F. (about 980° C to 1320° C.) and preferably 1900°F to 2000° F. (about 1040°C to 1090° C).⁴

Given the ample heat received by Ashworth's pyrolysis unit 30 from the char gasification unit 40, it is submitted that one skilled in the art would find no need to supply Ashworth's pyrolysis unit 30 with Mansour's pulse combustors.

In view of the foregoing, it is submitted that independent claims 33 and 94, and all claims depending thereon, are patentable over Ashworth in view of Mansour.

3. Dependent Claims 115-117 are patentable for reasons independent of their dependency on their respective base claims because Monacelli explicitly teaches away from introducing steam into fluidized bed 54.

Claims 115, 16 and 117 directly depend on independent claims 33, 94 and 106, respectively. Each of claims 115-117 recites adds the step of "introducing steam via a port directly into the fluidized bed, to serve as the fluidizing medium."

² Ashworth USP 4,097,361 at col. 6, lines 33-41. (Emphasis added).

³ Ashworth USP 4,097,361 at col. 6, lines 46-48.

⁴ Ashworth USP 4,097,361 at col. 6, lines 60-64.

On page 8 of the final office action, the Examiner notes that Monacelli discloses introducing steam into the “solids collection reservoir (76)”, but admits that Monacelli does not disclose introducing steam directed into the fluidized bed. For this, the Examiner turns to Ashworth. Specifically, on page 9 the Examiner first notes that Ashworth “discloses adding steam directly into the reactor (30), as a means to fluidize the initial gasification reaction (see Fig. 2)” and then argues that it would have been obvious to “add steam directly into the fluidized bed of Monacelli, as taught by Ashworth.”

The Examiner’s rejection is in error because Monacelli explicitly teaches away from introducing steam directly into fluidized bed 54:

Processed steam (3) is also provided to the reactor (10) for the bed (76). The processed steam (3) is generated using a flue gas waste heat boiler (48). Both the air stream (2) and the steam stream (3) are too cold to add directly to the gasification bed (54). A significant fraction of the total heat input is required just to bring them up to bed temperature. Thus, a heat exchanger (78) is preferably used in bed (76). Any other suitable external heating method may also be used.⁵

Furthermore, Ashworth’s teaching of directly injecting steam into the pyrolysis unit 30 is inapplicable to Monacelli because Ashworth’s pyrolysis unit 30 receives sufficient heat from Ashworth’s char gasification unit 40:

The pyrolysis unit 30 employs a fluidized bed of hot ash and char. Preheated steam from conduit 31 is injected upwardly into the fluid bed as the fluidizing medium, whereby hydrogen required for the hydrogenation and hydrocracking reactions is produced by way of the steam-carbon and water-gas-shift reactions. No air or oxygen is required, and direct heating is not necessary because the heat requirements are supplied by hot recycled ash from the char gasification unit 40.⁶

Since Monacelli specifically states that steam is too cold to introduce into the fluidized bed 54 to operate the bed 154, it is submitted that the Examiner’s rejection of dependent claims 115-117 is in error and should be withdrawn.

4. Dependent Claims 118-120 are patentable because one skilled in the art would not find it obvious to modify Monacelli’s fluidized bed 76 to be a fixed bed

⁵ Monacelli USP 5,752,994 at col. 6, lines 13-20. (Emphasis added).

⁶ Ashworth USP 4,097,361 at col. 6, lines 33-41. (Emphasis added).

In formulating the rejection of claims 118-120, the Examiner first conceded that Monacelli's lower fluidized bed 76 is not configured as a fixed bed, but pointed out that Frewer discloses a fixed bed 10 for steam gasification "which allows larger sized carbonaceous material to be static while steam is passed in contact with the solids and facilitates the steam gasification reaction." The Examiner then argued that it would have been obvious to modify Monacelli's lower fluidized bed 76 to be a fixed bed, the alleged motivation being "to allow larger sized carbonaceous material to be static while steam is passed in contact with the solids and facilitates the steam gasification reaction."

It is submitted that the Examiner's alleged motivation does not exist in light of the operation and purpose of Monacelli's lower fluidized bed.

Monacelli's two fluidized beds 54 and 76 operate in series. The primary intent of lower fluidized bed 76 is to heat up and provide the fluidization medium 19 to the upper fluidized bed 54. Heating in lower fluidized bed 76 is accomplished by a heat exchanger 78 which may burn product gas 58 and additionally by burning ungasified carbon 80. Nothing suggests that it would be desirable for Monacelli to employ "larger sized carbonaceous material", as suggested by the Examiner. This requires that lower fluidized bed 76 be a fluid bed and not a fixed bed for satisfactory heat transfer.

In light of the foregoing, it is submitted that one skilled in the art would not find it obvious to modify Monacelli's lower fluidized bed 76 to be a fixed bed, as suggested by the Examiner. Accordingly, dependent claims 118-120 are believed to define over the cited references for reasons independent of their dependency on their respective base claims.

With respect to all claims not specifically mentioned, it is submitted that these are patentable not only by virtue of their dependency on their respective base claims and any intervening claims, but also for the totality of features recited therein.

Reconsideration of the application is requested. All pending claims are believed to be allowable over the prior art of record. An early notice of allowance is solicited so that the application may proceed to issue.

U.S. Serial No. 10/659,725
Amendment in Response to 07-Dec-2009 Final Office Action

The Director is authorized to charge any required fees, including extension of time fees, to Womble Carlyle's Deposit Account No. 09-0528, referencing "T127 1010.1".

Respectfully Submitted,

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